

METHOD AND SYSTEM FOR MANAGING AND DELIVERING WEB
CONTENT TO INTERNET APPLIANCES

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10 BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to accessing to
information over the Internet. In particular, the
present invention relates to a customized access to
15 information over the Internet by various internet
appliances with various processing capabilities.

2. Discussion of the Related Art

As the Internet has become a preferred medium for
information access and dissemination, many different
20 devices (e.g., mobile phones, personal digital
assistants and handheld computers) can now be used to
access information on the Internet. In general, these
devices typically have much lesser text and graphical
processing capabilities than a conventional desktop
25 computer. (For convenience, in the remainder of this
description, these devices are collectively referred to
as "internet appliances".) As much of the information
on the Internet is organized for access by a desktop
computer using a hypertext protocol (e.g., http),
30 access to such information by a device other than a
desktop computer can be inefficient. For example, many

web pages are designed with a high-resolution graphical display in mind. Even when possible, accessing such web pages from a mobile telephone without a graphical display and providing only a limited number of short
5 lines for text display can be a very frustrating experience.

To accommodate the different capabilities of the internet appliances, in the prior art, an operator of a website typically provides for each supported internet
10 appliance a specialized "edition" of the website accessible through a specialized gateway. For example, since the current generation of mobile telephones are typically only capable of displaying text of a small number of characters per line, an operator would
15 provide specially designed text-only "stripped down" web pages accessible through a wireless access protocol (WAP) gateway. In most instances, information available in the general edition of the web pages are included or excluded by the designer or operator based
20 on its resource availability or other criteria, without user participation. Often, therefore, information important to some users is arbitrarily excluded, thereby severely reducing the utility of the web pages.

Where a specialized website is not available, the
25 gateway would provide only the text from the web pages and discard or ignore graphical information, animation or other functions embedded in the web pages. In such an instance, no attempt is typically made to filter the information based on the content of a web page.
30 Consequently, a relatively small web page can result in the user pressing the "scroll" key a large number of times. Many users therefore do not consider internet appliances to be suitable for serious information retrieval purposes.

SUMMARY OF THE INVENTION

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The present invention provides a method and a system for customizing a structured document (e.g., a web page) for delivery to an internet appliance. The present invention allows a structured document to be customized according to a user's preferences and according the particular requirements of an accessing device, rather than arbitrarily determined by a gateway operator or a web service provider of the structured document.

In one embodiment, a method of the present invention includes: (a) identifying information units in the structured document; (b) selecting one or more of the information units for delivery; (c) creating in a database a second structured document which includes the selected information units; and (d) delivering the second structured document to the internet appliance. In one implementation, the second structured document is provided in the database in the form of an XML document.

In one embodiment, a management server creates a menu for selection, which includes the information units identified in the structured document. The menu is typically presented to the user who is using a conventional browser running on a machine with a high-resolution graphical display. Typically, after the customization is complete, subsequent access to the customized structured document is provided to an internet appliance with limited bandwidth or display capability, such as a mobile telephone, a personal digital assistant, or a hand-held computer.

Typically, the user logs into the management server using standard verification procedures (e.g.,

(e) a device profile record associating the user_client record with the device record. In one embodiment, the database further includes a channel record associated with the user_client record to represent a pre-
5 configured resource. To associate the customized structured documents with the user and the associated device, a site record is provided associating the user_client record. In turn, a customization record associates the site record with modification of the
10 resource or structured document in accordance with the device profile record.

In one embodiment, a document customization system of the present invention includes: (a) a management server offering a document customization service to a user; (b) a document manager associated with the management server performing the document customization service to structured documents identified by the user; (c) a database accessible by the document manager, the database storing customized structured documents resulting from the document customization service; and (d) a portal for accessing the customized structured documents in the database. The document manager parses a structured document to identify information units in the structured document. In one implementation, the customized structured documents are stored in a hypertext format, such as XML.

In one embodiment, the management server provides a user a web page-based interface to the document manager.

30 The present invention is better understood upon
consideration of the detailed description below and the
accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram 100 of a system providing customized access to web content in accordance with one embodiment of the present invention.

5 Figure 2 is a flow diagram 200 illustrating interactions between management server 105 and a user during a management session, in accordance with the present invention.

10 Figure 3 is a flow diagram 300 illustrating the interactions between an internet appliance and portal 108 during an access of web resources by the internet appliance, in accordance with the present invention.

Figure 4 shows a data structure 400 suitable for use with the operations of management server 105.

15 Figure 5 is a block diagram illustrating procedure 500, which creates a bookmark for a first internet appliance, in accordance with an embodiment of the present invention.

20 Figure 6 shows a web page illustrating one application of the present invention.

Figure 7 shows a menu listing information units identified during processing of the web page of Figure 6 by a document manager, in accordance with one embodiment of the present invention.

25 Figure 8 shows the image of a processed web page received by an internet appliance, based on user preference determined from the menu listing of Figure 7.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

graphical images, executable application programs ("applets"), and embedded links to other structured documents. In the embodiment shown in Figure 1, document manager 106 parses a structured document to
5 break down the structured document into component inter-related information units and stores the information units into database 107. The user, through document manager 106, can manipulate these information units to create new documents, which can be output in
10 various formats (e.g., HTML, Microsoft Word, WML, PHTML etc.). In one embodiment, structured documents are stored in database 107 as XML documents. The elements of an XML document can be treated as information units.

One example of a document manager suitable for use
15 in conjunction with the present invention is disclosed in a copending patent application (the "Copending Application"), entitled "Method and System for Managing Reusable Information Units," serial no. _____, filed on May 4, 2000, which claims priority to a provisional
20 patent application, entitled "Method and System for Managing Reusable Information Units," serial no. 60/132,674, filed May 5, 1999. The Copending Application is hereby incorporated by reference in its entirety. A document manager related to the Copending
25 Application, which is also suitable for use in conjunction with the present invention is the Directive product, offered by Hynet Technologies.

Portal 180 is a gateway provided for communication with a mobile device, such as a web browser 103 running
30 on a mobile telephone, or an information retrieval application program 102, running on an internet appliance (e.g., the iLocator Module from @Road, Inc.) Communication with portal 180 is performed using a protocol specific to the internet appliance (e.g.,

the channels would deem the information relevant, and a frequency of channel update.

Figure 2 is a flow diagram 200 illustrating interactions between management server 105 and a user during a management session, in accordance with the present invention. As shown in Figure 2, at step 201, the user enters the management session from an entry point, such as the home page of the operator of management server 105 (e.g., <http://www.atroad.com>).

In this instance, access to the user records is provided only upon proper identity verification procedure (step 202), such as by the user providing a user name and a password. If the user is not a registered user, registration may occur at step 203. In one embodiment, a user is associated with two files: "bmList.txt" and "menu.wml". "bmList.txt" is a file listing customized resources ("bookmarks") associated with the user. Portal 108 reads "menu.wml" to create a suitable menu for web content navigation using an internet appliance. Figure 4 shows a data structure 400 suitable for use with the operation of management server 105. For each user, a user record 401 is assigned.

In this example, upon entering the management session, the user is presented (step 204) a menu from which the user can select one of five procedures: (1) register a device, (2) configure a device, (3) create a bookmark, (4) modify a bookmark, and (5) associate a bookmark to a registered device.

From the menu of step 204, if the user elects to register a device (step 205), the user identifies the device to be registered from a list of devices (e.g., a particular make and model of a mobile telephone) known to management server 105. The user then enters

identification and operational information specific to device (step 211), confirms the information (step 212) and creates and saves the device record into management server 105's device data base (steps 213 and 214). For each device, management server 105 retrieves user_client record 406, which associates client record 402 with user record 401. (Client record 402, shown in Figure 4, identifies a client -- the identity of the subscriber to the current service). Management server 105 then creates device profile record 404, which associates physical device record 403 with user_client record 406. Physical device record 403 identifies the physical device in the database and references device information record 405, which provides additional information regarding the operational characteristics or attributes of the physical device (e.g., telephone number assigned to the device, email address to send any electronic mail to the device, model number etc.) Management server 105 then returns the user to step 204.

From the menu of step 204, if the user elects to configure a registered device (step 206), management server 105 retrieves the profile of an existing device (step 216), and allows the user to edit the retrieved
25 profile. When the user confirms the changes made (step 217), the user is allowed to authorize overwriting the existing device record (step 218), or to save the modified profile for a new device (step 219). The same profile can be applied to different device records
30 (step 220). When the modifications are confirmed and saved (steps 221 and 222), management server 105 returns the user to step 204. In one embodiment, step 206 can also be used similarly to retrieve and modify the configuration of a channel. As shown in Figure 4,
35 channel personalization record 409 and range value

record 410 are created to support these pre-configured channels. Channel personalization record 409, which includes identities of the channels the user has selected, associates the configurations of these channels to user_client record 406. Channel personalization record 409 also associates with each channel valid range values defined in range value record 410. A procedure similar to that disclosed in steps 215-222 can be used to allow a modification of a channel configuration (e.g., changing range values).

From the menu of step 204, if the user elects to create a bookmark (step 207), management server 105 allows the user to create a bookmark from either a pre-processed list (step 223) of web resources, or enters a uniform resource locator ("URL") to identify a web resource not on the list (step 224). From either choice, the web resource is retrieved from the appropriate server (e.g., server 101 of Figure 1) and processed (step 225) to identify the information units in the resource or structured document, using document manager 106. Manager 106 can be, for example, the document manager described in the Copending Application mentioned above. Processing the retrieved resource is described in further detail below in conjunction with Figures 5 and 6.

Once processed, document manager 106 allows the user to customize the use of the resource (step 226). For example, in one embodiment, the user is allowed to identify the information units to be delivered when
30 accessing a resource from a specified internet appliance. This example is illustrated in Figures 6-8. Figure 6 shows a web page from <http://www.yahoo.com>. Management server 105 allows a user to customize access to this web page from an internet appliance with
35 limited display capabilities, such as a mobile

From the menu of step 204, if the user elects to modify a bookmark (step 208), management server 105 allows the user to modify a bookmark from either the list of bookmarks associated with the user (step 234),
5 or allows the user to edit the list of bookmarks itself (step 233). If the user selects an existing bookmark to modify, the bookmark is retrieved from database system 107 (step 234) and the steps 225-231 described above are carried out. Otherwise, the user is allowed
10 to edit the list of bookmarks at step 235. The edited bookmark list is confirmed and saved into database 107 (steps 235 and 237). Management server 105 then returns the user to step 204.

From the menu of step 204, if the user elects to
15 associate a bookmark with a registered device (step 209), management server 105 retrieves the list of bookmarks associated with a specified device (step 238) and allows the user to select from that list bookmarks to be associated with other devices (step 239). The
20 user can then associated each selected bookmark with one or more devices selected from a list of registered devices (step 240). In fact, management server 105 allows association not only with registered devices (step 242), additional devices can also be created
25 (step 243). The associations of bookmarks with devices are confirmed and saved into database 107 (steps 244 and 245). Management server 105 then returns the user to step 204.

Figure 5 shows in further detail the bookmark
30 creation or modification process, in accordance with the present invention. As shown in Figure 5, during the management session 501, at step 502, management server 105 creates a web page (in HTML format, in this example) which is a menu or a form that solicits a user
35 input of an URL. Upon receiving the URL, the web

resource corresponding to the URL is retrieved as an HTML document (for example only) and parsed by a document manager, also whimsically called an "inhaler" (steps 504 and 505). The document manager or inhaler identifies the information units in the document to create a document object model (DOM) at step 506. From the DOM, the document manager creates an option list, which is presented to the user to allow the user to select the preferred information units using a conventional web browser (step 508a). Based on the user selections, a personalized list capturing the user's preferences is created (step 510). Based on the personalized list, processed documents suitable for display on specific devices (e.g., WML processed document 511 and PHTML processed document 512) are provided. (PHTML is a version of HTML typically used in a personal digital assistant or "Palm" device). In addition, in one embodiment, when the user accesses the processed document at a later time using the internet device, resources in the processed document (e.g., resources reachable from the hypertext links in the processed document) can similarly be processed (e.g., WML processed document 514 or PHTML processed document 515) using the steps 504-507 in the manner described above. An option list can be generated in a similar manner as described above with respect to step 508a. In this instance, the option list is presented to the user in the form suitable for the internet appliance, such as WML document (step 508b) or a PHTML document (step 508c). As in the instance of the user in front of a desk top computer, a user can enable customization through WML document 508b or PHTML document 508c from the mobile telephone or the palm device.

Figure 3 is a flow diagram 300 illustrating the
35 interactions between an internet appliance and portal

108 during an access to a web resource by the internet appliance, in accordance with the present invention. As shown in Figure 3, when the user initiates access, the user first accesses the home page "Myweb2go". (the
5 file "portal.wml"). Upon receiving request for this web page, portal 108 checks if the accessing device is a supported device (step 302). If the accessing device is not supported, a generic error page "errorMsg.wml" is returned (step 306). Otherwise, portal 108 checks
10 whether or not the accessing device is a registered device (step 303). If it is not a registered device, the accessing device is registered using default settings (step 304). Thereafter, the channels and the processed list of bookmarks are made available to the
15 user (step 305).

The above detailed description is provided to illustrate the specific embodiments of the present invention and is not intended to be limiting. Numerous modifications and variations within the scope of the present invention are possible. The present invention is set forth in the following claims.